

# MOISTURE & DENSITY TEST

Client : URS/ARUP/HMM JV

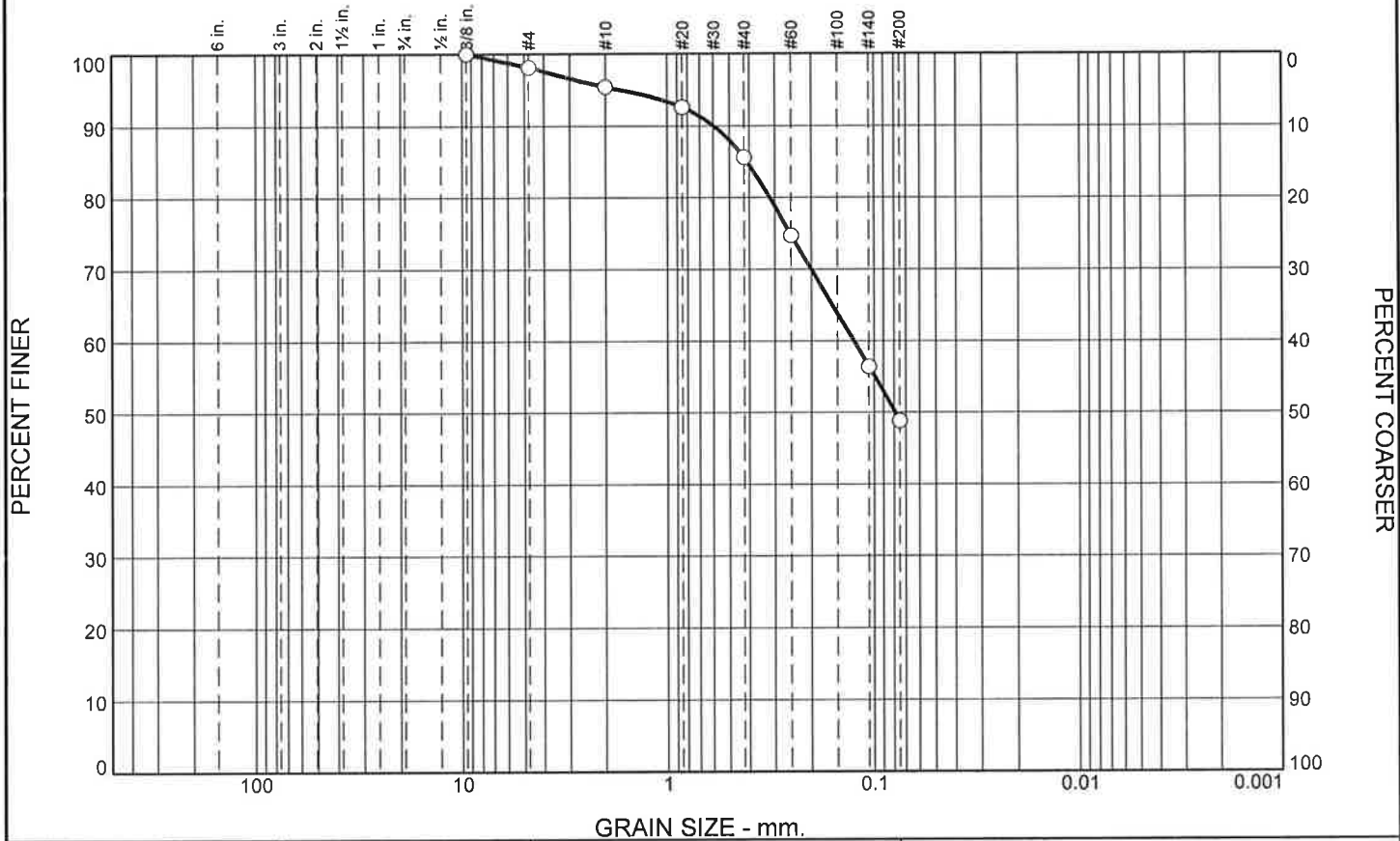
Project : California High Speed Train

ISI Lab No.: G-52569  
Job no : 2636-001.0

Boring #	S0034BR	S0034BR	S0034BR	S0034BR				
Sample #	MC03-2	MC07-2	MC11-1	MC13-1				
Depth ( ft.)	10.5-11.0	30.5-31.0	51.0-51.5	61.0-61.5				
Soil type: ( visual )	Sand	Sandy silty clay with gravel	Sandy silt	Sandy silt				
1. Date tested:	09/13/13	09/13/13	09/13/13	09/13/13				1.
2. Tested by:	PH	PH	PH	PH				2.
3. Specimen height ( in. )	2.82	6.02	5.98	6.05				3.
4. Wt. of specimen + tare ( gm )	405.46	956.85	894.49	950.29				4.
5. Tare wt. ( gm )	0.00	0.00	0.00	0.00				5.
6. Diameter ( in. )	2.38	2.40	2.41	2.40				6.
7. Wet wt. of soil + dish wt. ( gm )	676.44	395.70	318.98	327.92				7.
8. Dry wt. of soil + dish wt. ( gm )	595.91	349.55	270.71	282.10				8.
9. Wt. of dish ( gm )	195.07	50.87	50.73	50.83				9.
10. Dish ID								10.
<b>Wet Density ( pcf )</b>	123.0	133.7	124.8	132.2				
<b>Dry Density ( pcf )</b>	102.4	115.8	102.4	110.3				
<b>Moisture Content ( % )</b>	20.1	15.5	21.9	19.8				
Gs ( Assumed )	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
Void Ratio	0.645	0.454	0.646	0.527				
Saturation ( % )	84.1	91.8	91.7	101.4				
Additional data:								
Wt. of dry soil + dish before washing ( gm )								
Wt. of dry soil + dish after washing ( gm )								
% Passing # 200 sieve								
USCS symbol								



# Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	2	3	9	37	49	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8	100		
#4	98		
#10	95		
#20	93		
#40	86		
#60	75		
#140	56		
#200	49		

\* (no specification provided)

**Soil Description**

Sandy silt

**Atterberg Limits**

PL=      LL=      PI=

**Coefficients**

D<sub>90</sub>= 0.5959      D<sub>85</sub>= 0.4103      D<sub>60</sub>= 0.1253  
D<sub>50</sub>= 0.0790      D<sub>30</sub>=      D<sub>15</sub>=  
D<sub>10</sub>=      C<sub>u</sub>=      C<sub>c</sub>=

**Classification**

USCS=      AASHTO=

**Remarks**

F.M.=0.79

Source of Sample: S0034BR G-52569  
Sample Number: B01

Depth: 0-5

Date:



Client: URS/ARUP/HMM JV  
Project: California High Speed Train

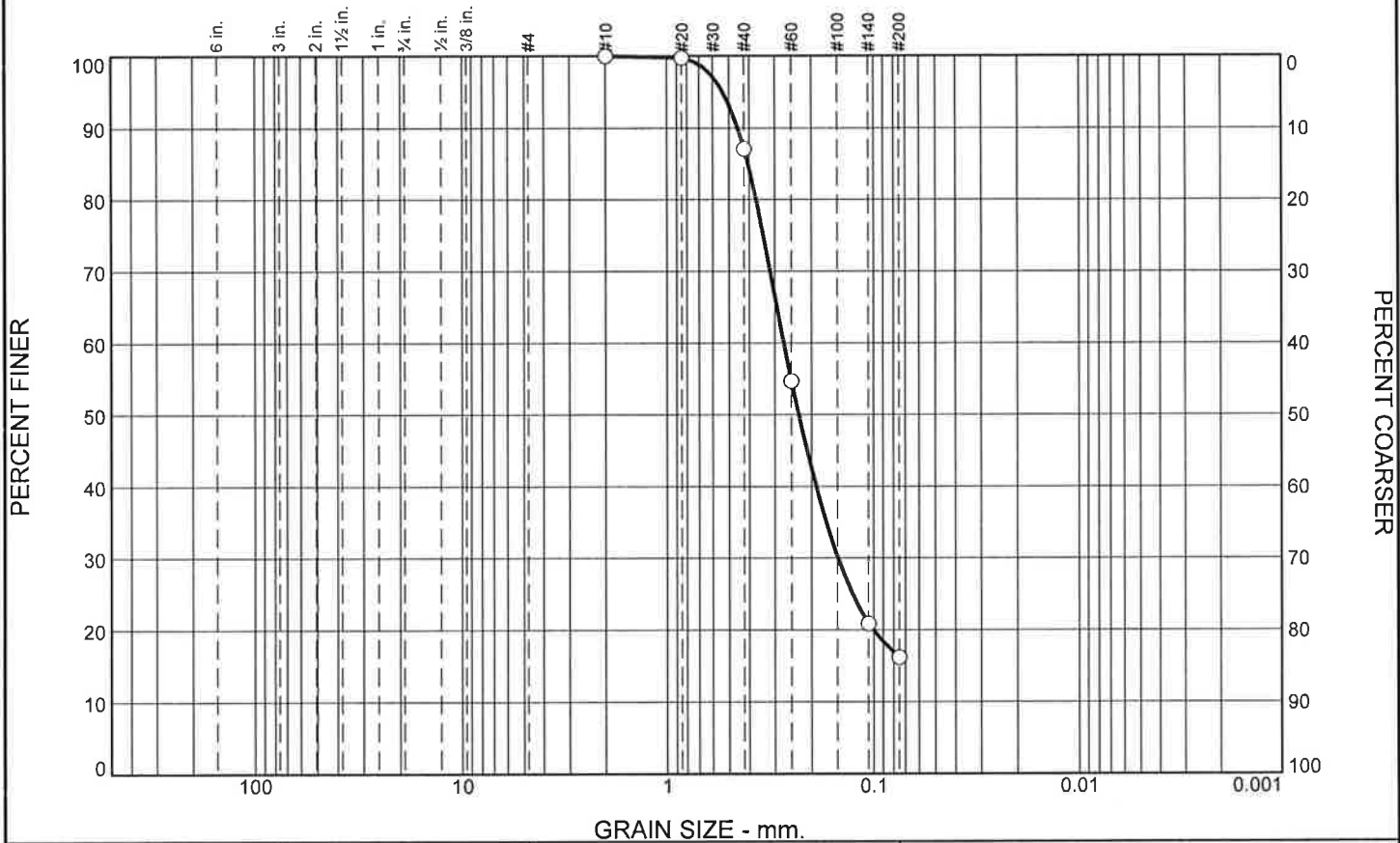
Project No: 2636-001.0

Figure

Tested By: PH

Checked By: PH

# Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	13	71	16	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100		
#20	100		
#40	87		
#60	55		
#140	21		
#200	16		

\* (no specification provided)

**Soil Description**

Sand with silt

**Atterberg Limits**

PL=      LL=      PI=

**Coefficients**

D<sub>90</sub>= 0.4551      D<sub>85</sub>= 0.4067      D<sub>60</sub>= 0.2719  
D<sub>50</sub>= 0.2311      D<sub>30</sub>= 0.1492      D<sub>15</sub>=  
D<sub>10</sub>=      C<sub>u</sub>=      C<sub>c</sub>=

**Classification**

USCS=      AASHTO=

**Remarks**

F.M.=1.06

Source of Sample: S0034BR G-52569  
Sample Number: SS02

Depth: 6.0-6.5

Date:



Client: URS/ARUP/HMM JV  
Project: California High Speed Train

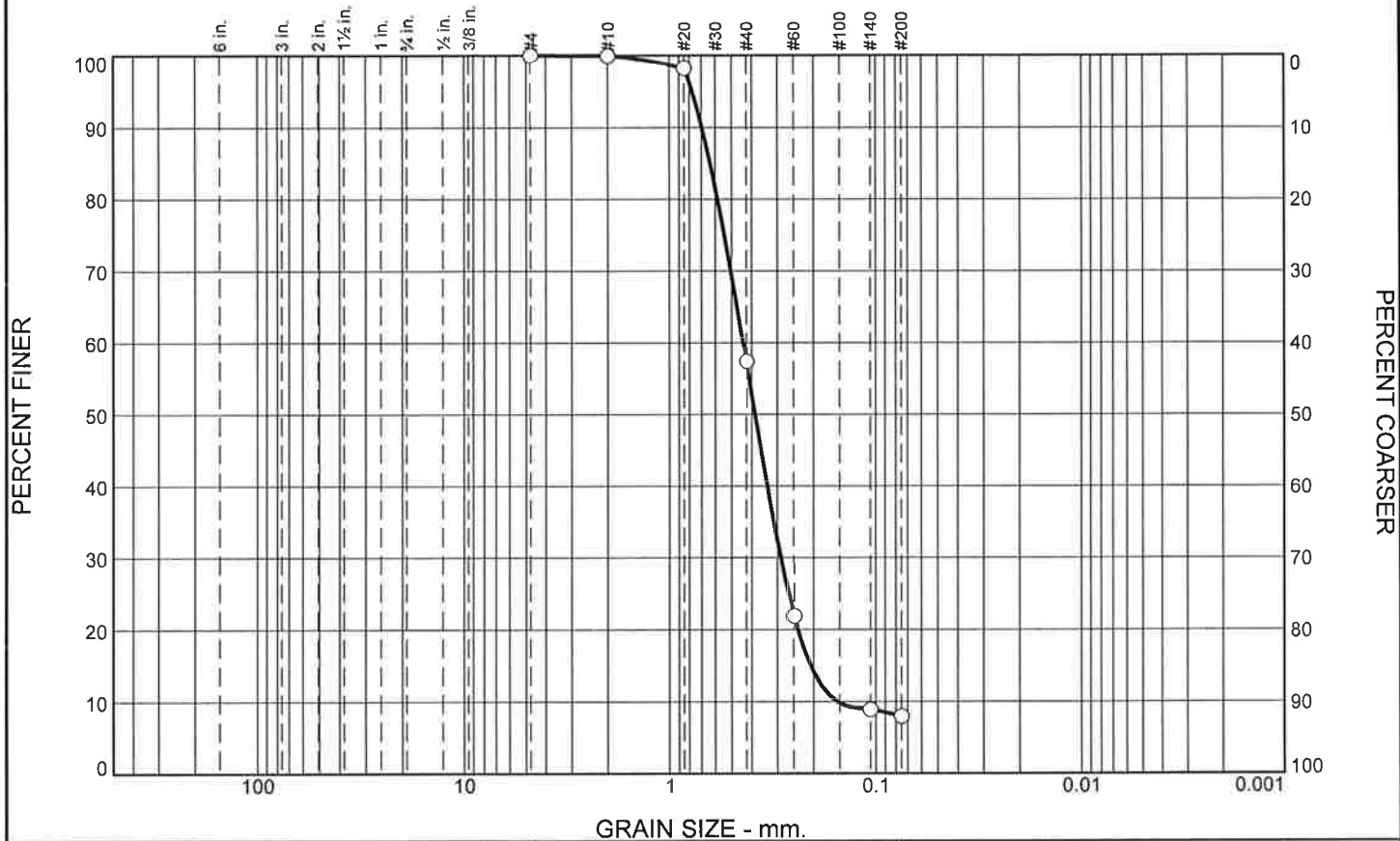
Project No: 2636-001.0

Figure

Tested By: PH

Checked By: PH

# Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	43	49	8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#10	100		
#20	98		
#40	57		
#60	22		
#140	9		
#200	8		

(no specification provided)

<b>Soil Description</b>		
Sand		
<b>Atterberg Limits</b>		
PL=	LL=	PI=
<b>Coefficients</b>		
D <sub>90</sub> = 0.6964	D <sub>85</sub> = 0.6356	D <sub>60</sub> = 0.4400
D <sub>50</sub> = 0.3852	D <sub>30</sub> = 0.2895	D <sub>15</sub> = 0.2073
D <sub>10</sub> = 0.1536	C <sub>u</sub> = 2.87	C <sub>c</sub> = 1.24
<b>Classification</b>		
USCS=	AASHTO=	
<b>Remarks</b>		
F.M.=1.77		

Source of Sample: S0034BR G-52569  
Sample Number: MC03-2

Depth: 10.5-11.0

Date:



Client: URS/ARUP/HMM JV  
Project: California High Speed Train

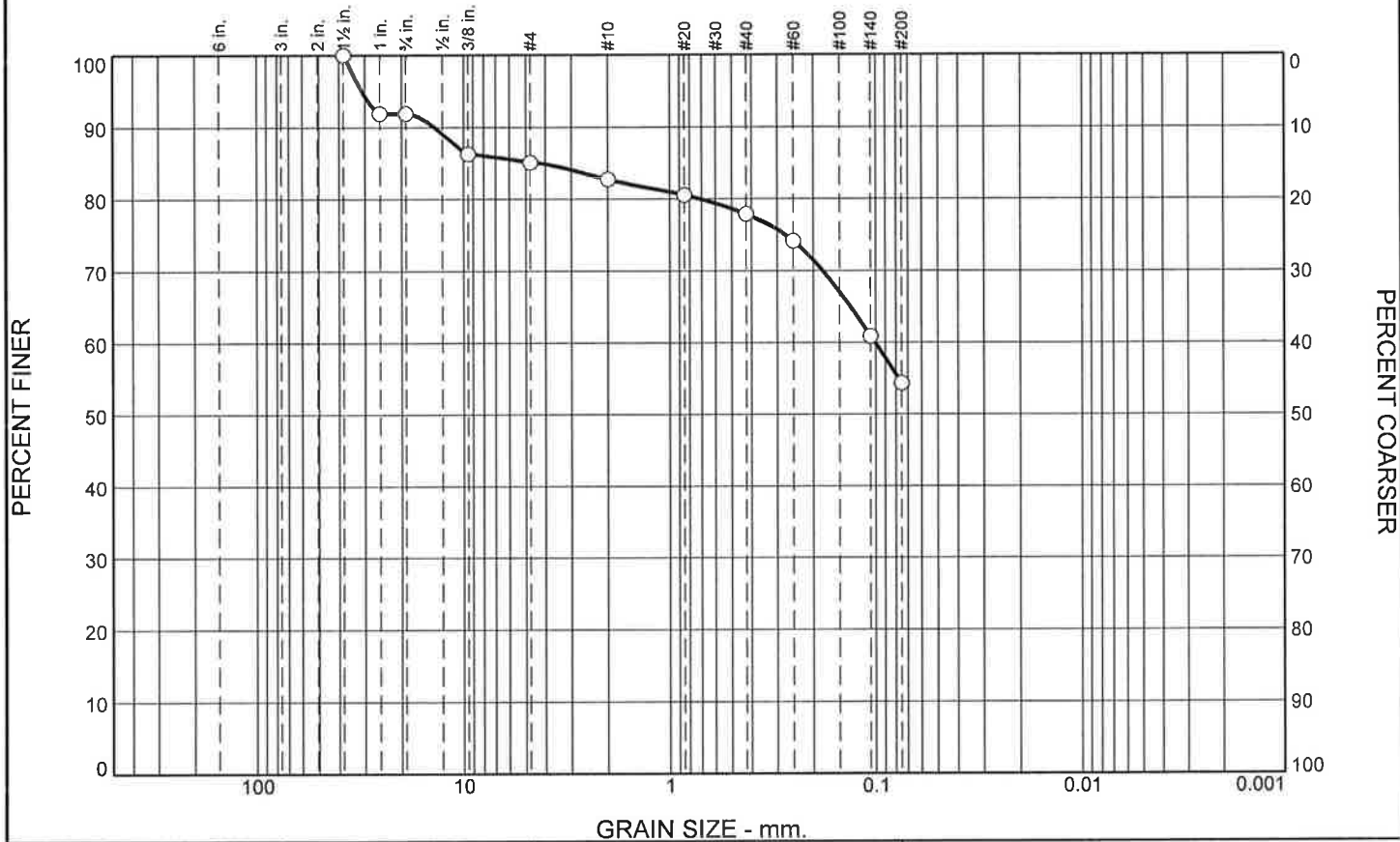
Project No: 2636-001.0

Figure

Tested By: PH

Checked By: PH

# Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	8	7	2	5	24	54	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100		
1	92		
3/4	92		
3/8	86		
#4	85		
#10	83		
#20	81		
#40	78		
#60	74		
#140	61		
#200	54		

\* (no specification provided)

<u><b>Soil Description</b></u>		
Sandy silty clay with gravel		
<u><b>Atterberg Limits</b></u>		
PL= 20	LL= 24	PI= 4
<u><b>Coefficients</b></u>		
D <sub>90</sub> = 13.8050	D <sub>85</sub> = 4.2814	D <sub>60</sub> = 0.1011
D <sub>50</sub> =	D <sub>30</sub> =	D <sub>15</sub> =
D <sub>10</sub> =	C <sub>u</sub> =	C <sub>c</sub> =
<u><b>Classification</b></u>		
USCS= CL-ML	AASHTO= A-4(0)	
<u><b>Remarks</b></u>		
F.M.=1.50		

Source of Sample: S0034BR G-52569  
Sample Number: MC07-2

Depth: 30.5-31.0

Date:



Client: URS/ARUP/HMM JV  
Project: California High Speed Train

Project No: 2636-001.0

Figure

Tested By: PH

Checked By: PH



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## Sieve Analysis for Soil and Fine Aggregate

Project:	CA HSR FRE_BAK	Technician:	K. Ford
TES#:	23502-ZS9	Date:	1/14/2014
Boring No.:	S0034BR	Depth, ft	41-41.5'
Sample No.:	MC09-1	Classification:	(SM/ML) Sandy Silt

	Weight (grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	74.6	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Soil Before Wash	74.6	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Soil After Wash	50.9	2"	44.0 (20.0)

Sieve Size	Individual Weight Retained	Individual % Retained	Combined % Retained	Combined % Passing	Specs.
3 in.	0.0	0.0	0.0	100.0	
2 1/2 in.	0.0	0.0	0.0	100.0	
2 in.	0.0	0.0	0.0	100.0	
1 1/2 in.	0.0	0.0	0.0	100.0	
1 in.	0.0	0.0	0.0	100.0	
3/4 in.	0.0	0.0	0.0	100.0	
1/2 in.	0.0	0.0	0.0	100.0	
3/8 in.	0.0	0.0	0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.0	0.0	0.0	100.0	
#10	0.1	0.1	0.1	99.9	
#16	0.2	0.3	0.4	99.6	
#30	0.2	0.3	0.7	99.3	
#40	0.1	0.1	0.8	99.2	
#50	0.3	0.4	1.2	98.8	
#100	6.6	8.8	10.1	90.0	
#200	29.5	39.5	49.6	50.5	
Pan					



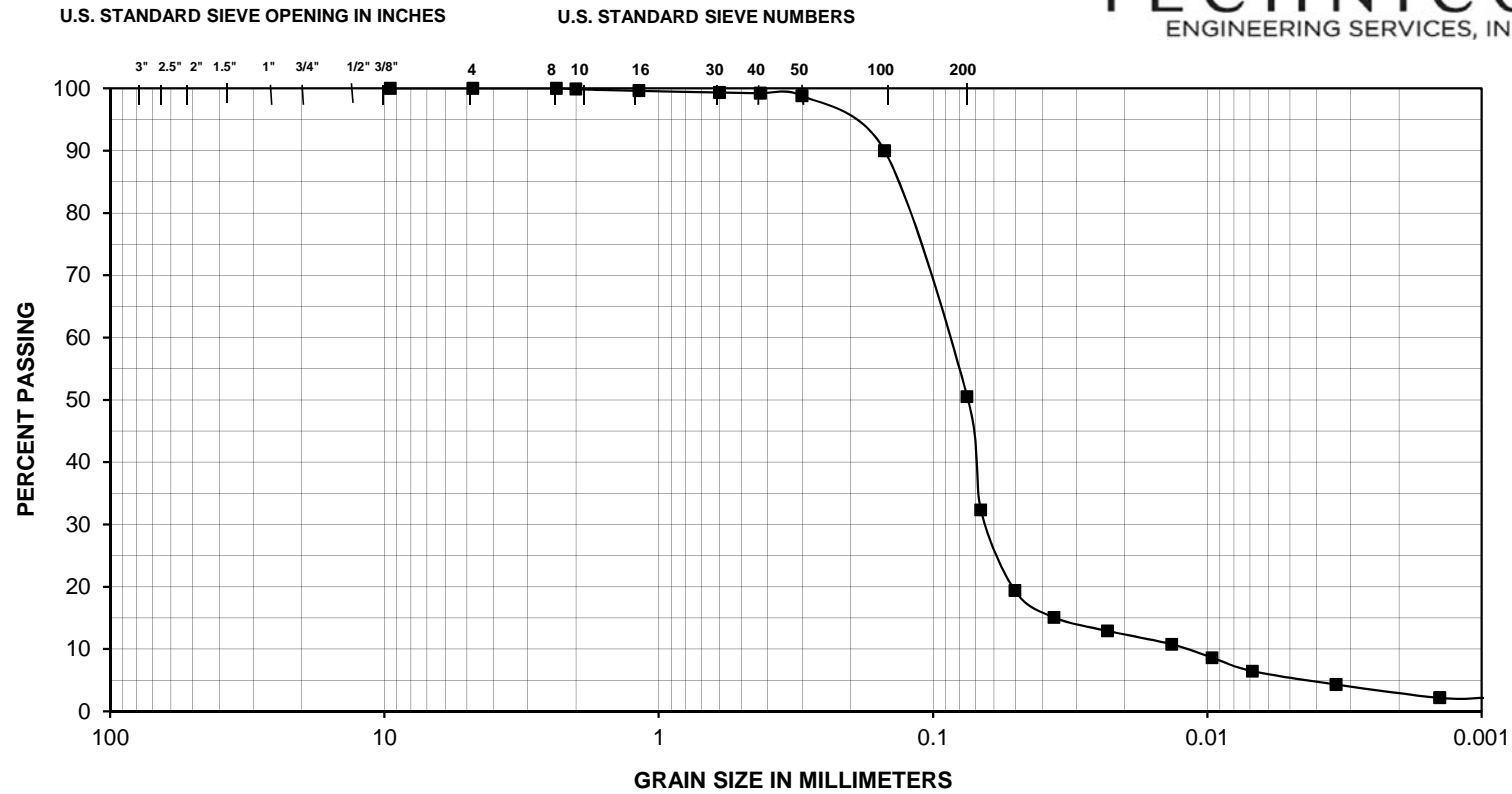
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## HYDROMETER TEST DATA SUMMARY

ASTM D 422-63

PROJECT:		CA HSR FRE_BAK			TES #: S0034BR		
Boring Number		S0034BR			DATE: 1/14/2014		
Sample Depth, ft		41-41.5'		Sample No.:	MC09-1		TESTED BY: K. Ford
Mass of Test Sample, g		75.00	"air-dried"	Hydrometer Type		151H	
Mass of Hygroscopic Sample, g		30.00	"air-dried"				
Mass of Hygroscopic Sample, g		29.84	"oven-dried"	Specific Gravity of Test Material		2.650	
Mass of Test Sample, g		74.60	"oven-dried"	Specific Gravity of Test Solution		Varies	
Time (min.)	Hydrometer Reading	Corrected Reading	Temperature Degrees C	Effective Depth Table 2 (cm)	Constant, K Table 3	Diameter, D (mm)	Amt. Suspended, P (%)
0.5	1.017	1.015	21	12.3	0.01348	0.0669	32.3
1	1.011	1.009	21	13.9	0.01348	0.0503	19.4
2	1.009	1.007	21	14.4	0.01348	0.0362	15.1
5	1.008	1.006	21	14.7	0.01348	0.0231	12.9
15	1.007	1.005	21	15.0	0.01348	0.0135	10.8
30	1.006	1.004	21	15.2	0.01348	0.0096	8.6
60	1.005	1.003	21	15.5	0.01348	0.0069	6.5
250	1.004	1.002	21	15.8	0.01348	0.0034	4.3
1440	1.003	1.001	21	16.0	0.01348	0.0014	2.2
3040	1.003	1.001	21	16.0	0.01348	0.0010	2.2



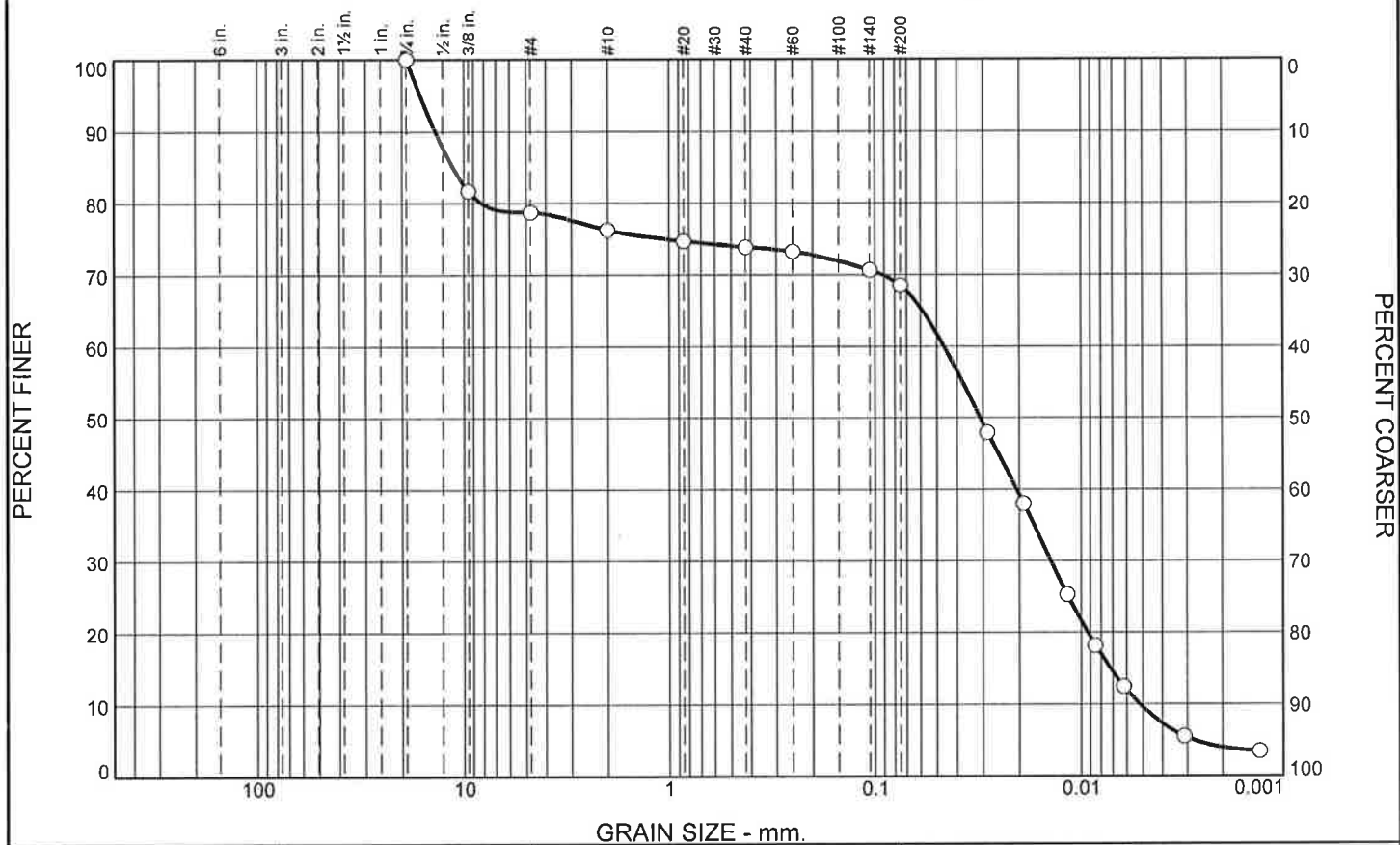


—■— 41-41.5'

Sample #	Classification	% Gravel	% Sand	% Silt	% Clay*	% Moist.	LL	PL	PI	Project:	CA HSR FRE_BAK
MC09-1	(SM/ML) Sandy Silt	0	49.6	45.0	5.4	0.5					
										TES#:	23502-ZS9
										Boring#:	S0034BR
										Date:	1/14/2014

\* Particles smaller than 5 Micron in diameter

# Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	21	3	2	5	59	10

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100		
3/8	82		
#4	79		
#10	76		
#20	75		
#40	74		
#60	73		
#140	71		
#200	69		
0.0286 mm.	48		
0.0191 mm.	38		
0.0117 mm.	25		
0.0085 mm.	18		
0.0062 mm.	12		
0.0031 mm.	6		
0.0013 mm.	3		

\* (no specification provided)

<u><b>Soil Description</b></u>		
Silt with gravel		
<u><b>Atterberg Limits</b></u>		
PL=	LL=	PI=
<u><b>Coefficients</b></u>		
D <sub>90</sub> = 13.7744	D <sub>85</sub> = 11.3274	D <sub>60</sub> = 0.0463
D <sub>50</sub> = 0.0310	D <sub>30</sub> = 0.0141	D <sub>15</sub> = 0.0072
D <sub>10</sub> = 0.0052	C <sub>u</sub> = 8.95	C <sub>c</sub> = 0.83
<u><b>Classification</b></u>		
USCS=	AASHTO=	
<u><b>Remarks</b></u>		
F.M.=1.68		

Source of Sample: S0034BR G-52569  
Sample Number: SS10

Depth: 46.0-46.5

Date:



Client: URS/ARUP/HMM JV  
Project: California High Speed Train

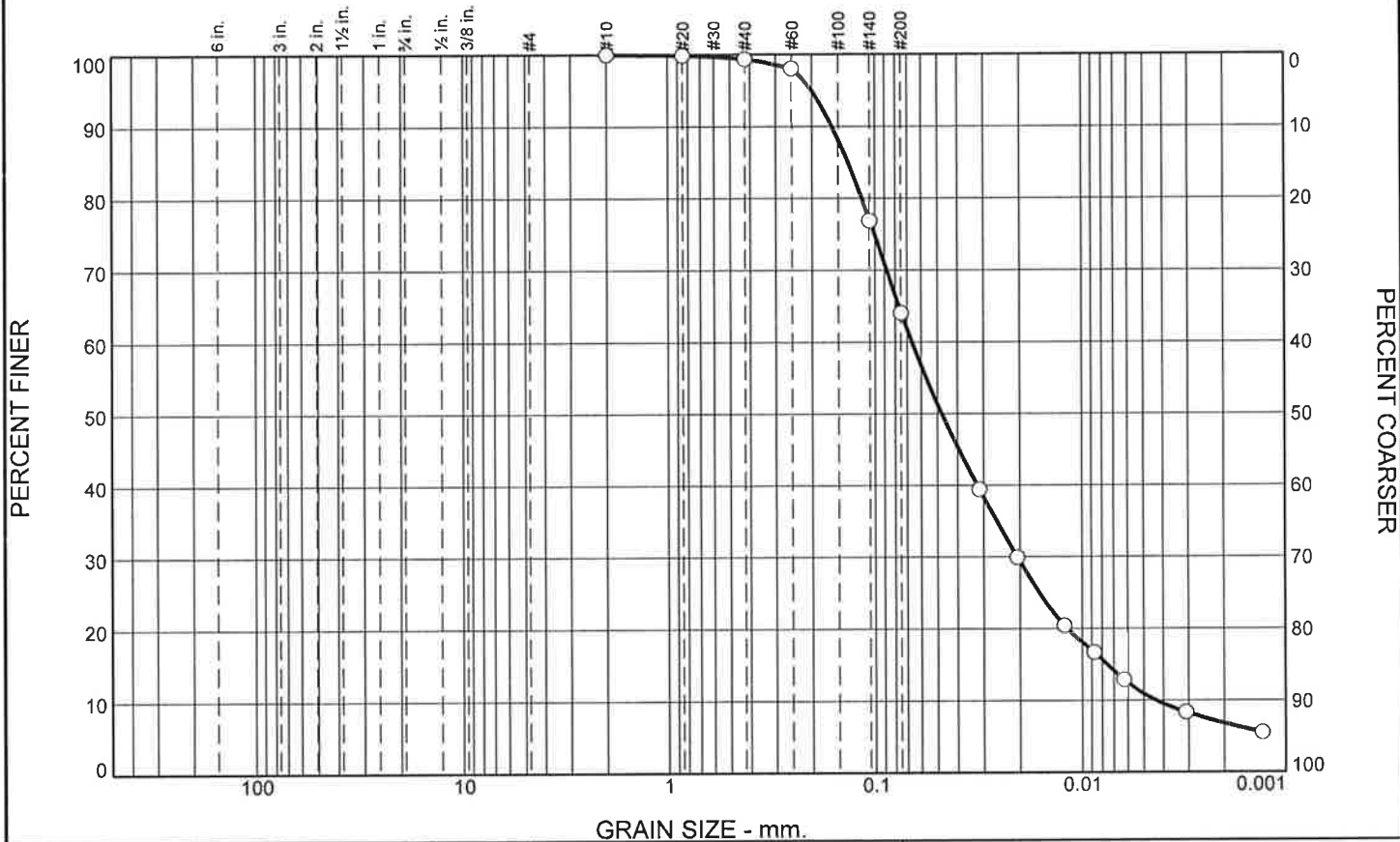
Project No: 2636-001.0

Figure

Tested By: PH

Checked By: PH

# Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	1	35	53	11

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100		
#20	100		
#40	99		
#60	98		
#140	77		
#200	64		
0.0315 mm.	39		
0.0206 mm.	30		
0.0123 mm.	20		
0.0088 mm.	17		
0.0063 mm.	13		
0.0031 mm.	8		
0.0013 mm.	6		

\* (no specification provided)

**Soil Description**  
Sandy silt

**Atterberg Limits**  
 PL=      LL=      PI=

**Coefficients**  
 D<sub>90</sub>= 0.1607      D<sub>85</sub>= 0.1348      D<sub>60</sub>= 0.0666  
 D<sub>50</sub>= 0.0478      D<sub>30</sub>= 0.0206      D<sub>15</sub>= 0.0075  
 D<sub>10</sub>= 0.0043      C<sub>u</sub>= 15.37      C<sub>c</sub>= 1.47

**Classification**  
 USCS=      AASHTO=

**Remarks**  
 F.M.=0.14

Source of Sample: S0034BR G-52569  
 Sample Number: MC11-1

Depth: 51.0-51.5

Date:



Client: URS/ARUP/HMM JV  
 Project: California High Speed Train

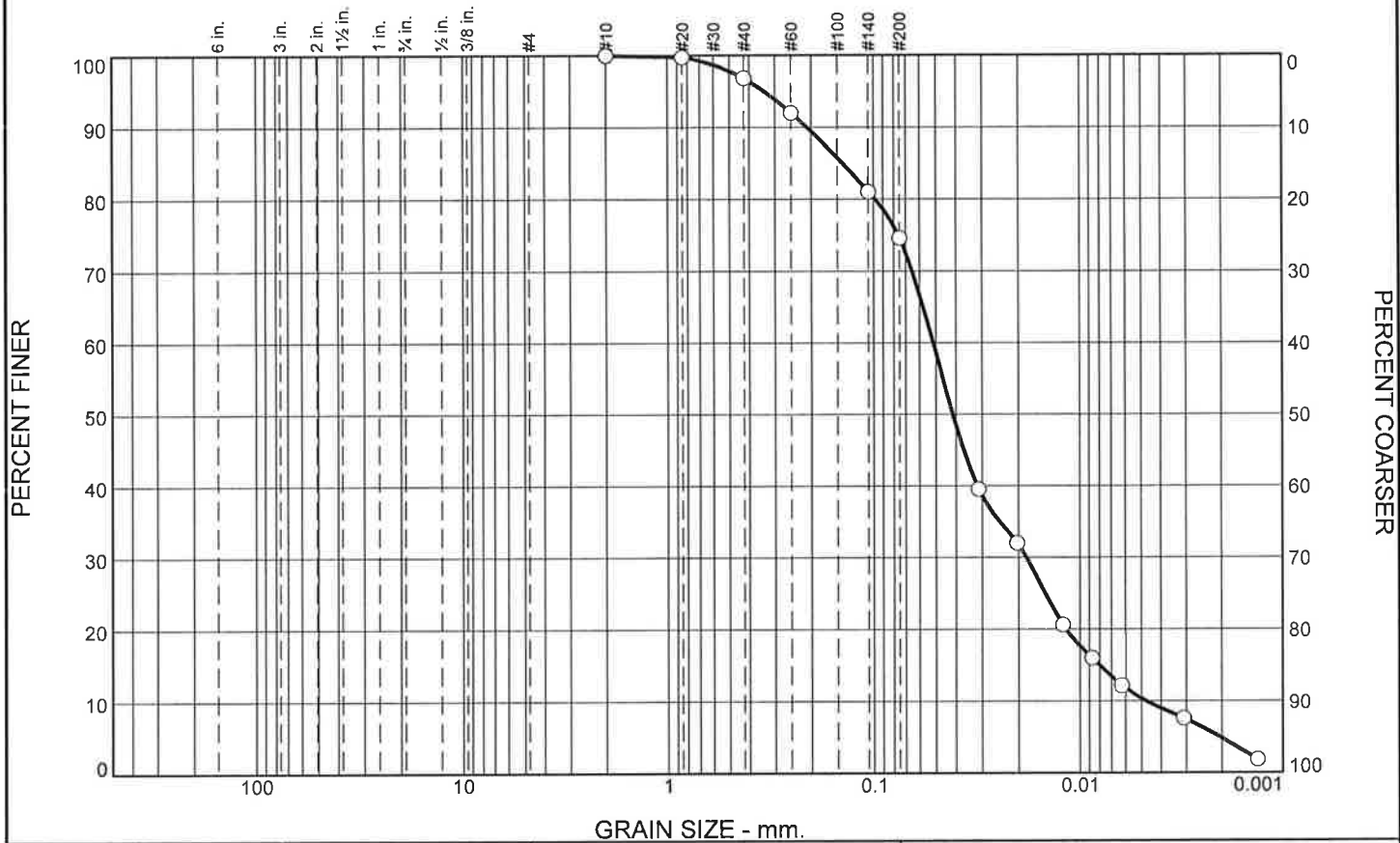
Project No: 2636-001.0

Figure

Tested By: PH

Checked By: PH

# Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	3	22	65	10

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100		
#20	100		
#40	97		
#60	92		
#140	81		
#200	75		
0.0313 mm.	40		
0.0203 mm.	32		
0.0122 mm.	21		
0.0087 mm.	16		
0.0062 mm.	12		
0.0031 mm.	8		
0.0013 mm.	2		

(no specification provided)

<u><b>Soil Description</b></u>		
Sandy silt		
<u><b>Atterberg Limits</b></u>		
PL=	LL=	PI=
<u><b>Coefficients</b></u>		
D <sub>90</sub> = 0.2095	D <sub>85</sub> = 0.1415	D <sub>60</sub> = 0.0517
D <sub>50</sub> = 0.0416	D <sub>30</sub> = 0.0184	D <sub>15</sub> = 0.0080
D <sub>10</sub> = 0.0047	C <sub>u</sub> = 10.98	C <sub>c</sub> = 1.38
<u><b>Classification</b></u>		
USCS=	AASHTO=	
<u><b>Remarks</b></u>		
F.M.=0.22		

Source of Sample: S0034BR G-52569  
Sample Number: MC13-1

Depth: 61.0-61.5

Date:



Client: URS/ARUP/HMM JV  
Project: California High Speed Train

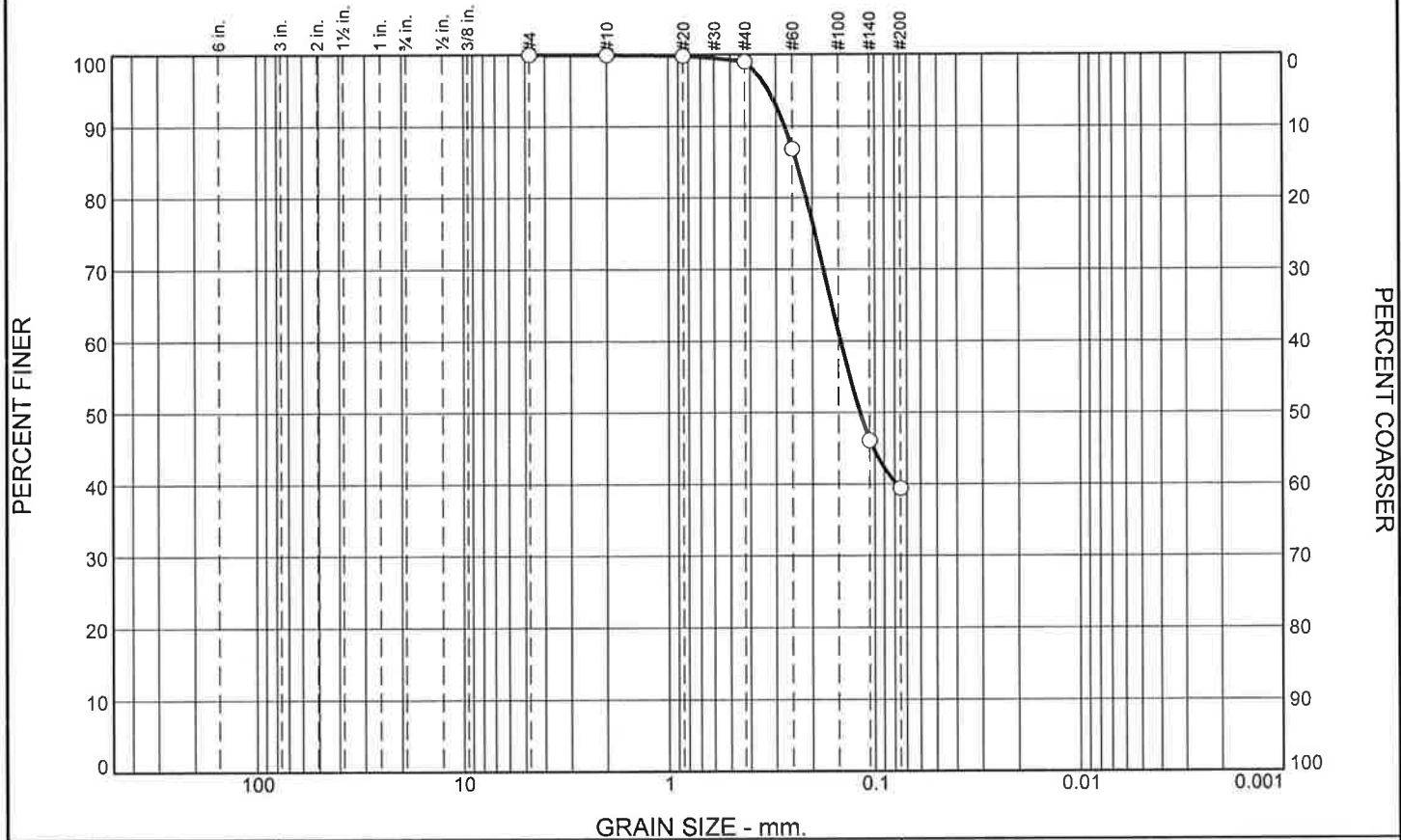
Project No: 2636-001.0

Figure

Tested By: PH

Checked By: PH

# Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	1	60	39	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#10	100		
#20	100		
#40	99		
#60	87		
#140	46		
#200	39		

\* (no specification provided)

**Soil Description**

Silty sand

**Atterberg Limits**

PL=      LL=      PI=

**Coefficients**

D<sub>90</sub>= 0.2724      D<sub>85</sub>= 0.2391      D<sub>60</sub>= 0.1467  
D<sub>50</sub>= 0.1184      D<sub>30</sub>=      D<sub>15</sub>=  
D<sub>10</sub>=      C<sub>u</sub>=      C<sub>c</sub>=

**Classification**

USCS=      AASHTO=

**Remarks**

F.M.=0.47

Source of Sample: S0034BR G-52569  
Sample Number: SS14

Depth: 66.0-66.5

Date:



Client: URS/ARUP/HMM JV  
Project: California High Speed Train

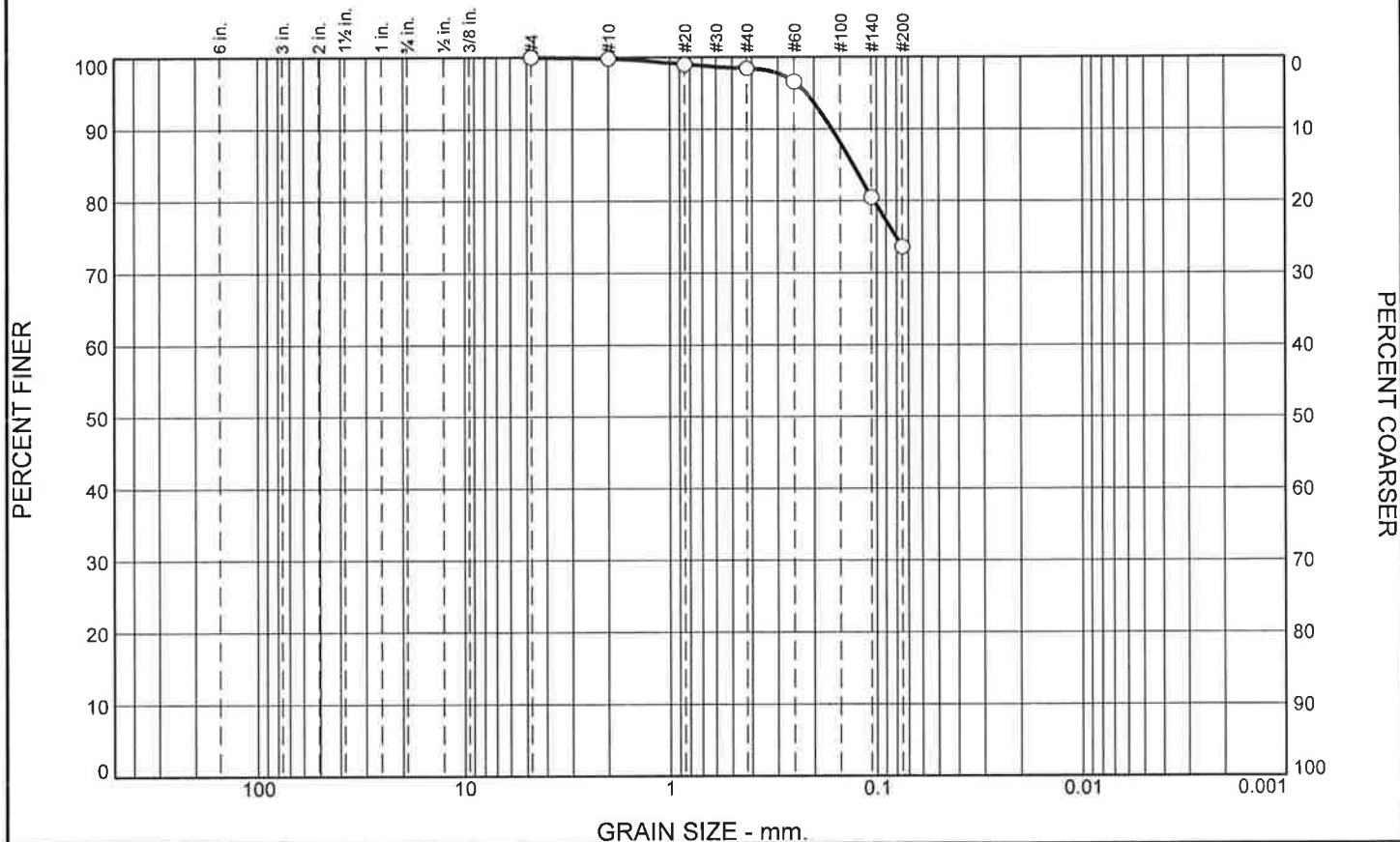
Project No: 2636-001.0

Figure

Tested By: PH

Checked By: PH

# Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	2	24	74	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#10	100		
#20	99		
#40	98		
#60	97		
#140	81		
#200	74		

\* (no specification provided)

**Soil Description**  
Silt with sand

**Atterberg Limits**  
 PL= NP      LL= NP      PI= NP

**Coefficients**  
 D<sub>90</sub>= 0.1646      D<sub>85</sub>= 0.1301      D<sub>60</sub>=  
 D<sub>50</sub>=      D<sub>30</sub>=      D<sub>15</sub>=  
 D<sub>10</sub>=      C<sub>u</sub>=      C<sub>c</sub>=

**Classification**  
 USCS= ML      AASHTO= A-4(0)

**Remarks**  
F.M.=0.16

Source of Sample: S0034BR G-52569  
Sample Number: SS16

Depth: 76.0-76.5

Date:



Client: URS/ARUP/HMM JV  
Project: California High Speed Train

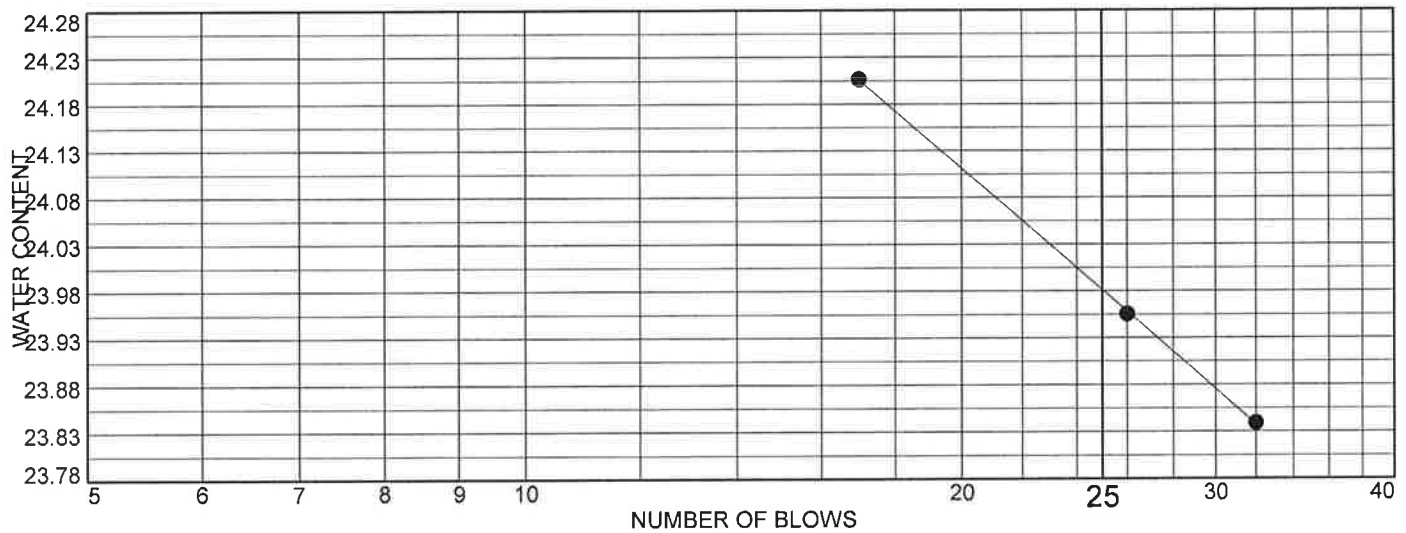
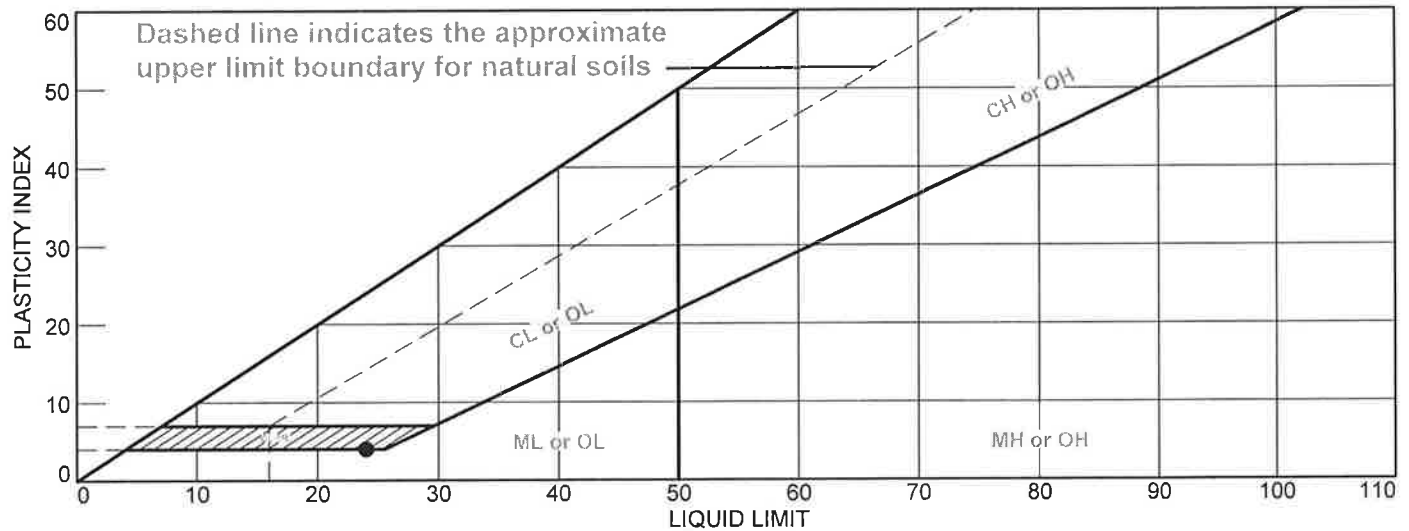
Project No: 2636-001.0

Figure

Tested By: PH

Checked By: PH

# LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Sandy silty clay with gravel	24	20	4	78	54	CL-ML

Project No. 2636-001.0 Client: URS/ARUP/HMM JV

Project: California High Speed Train

● Source: S0034BR G-52569

Depth: 30.5-31.0

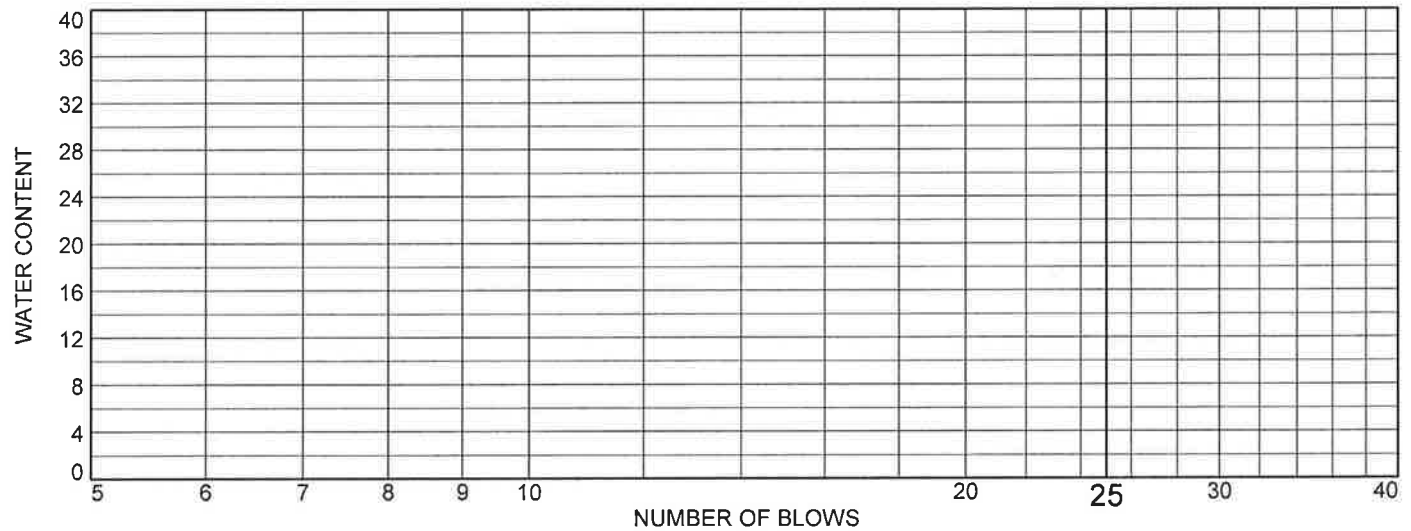
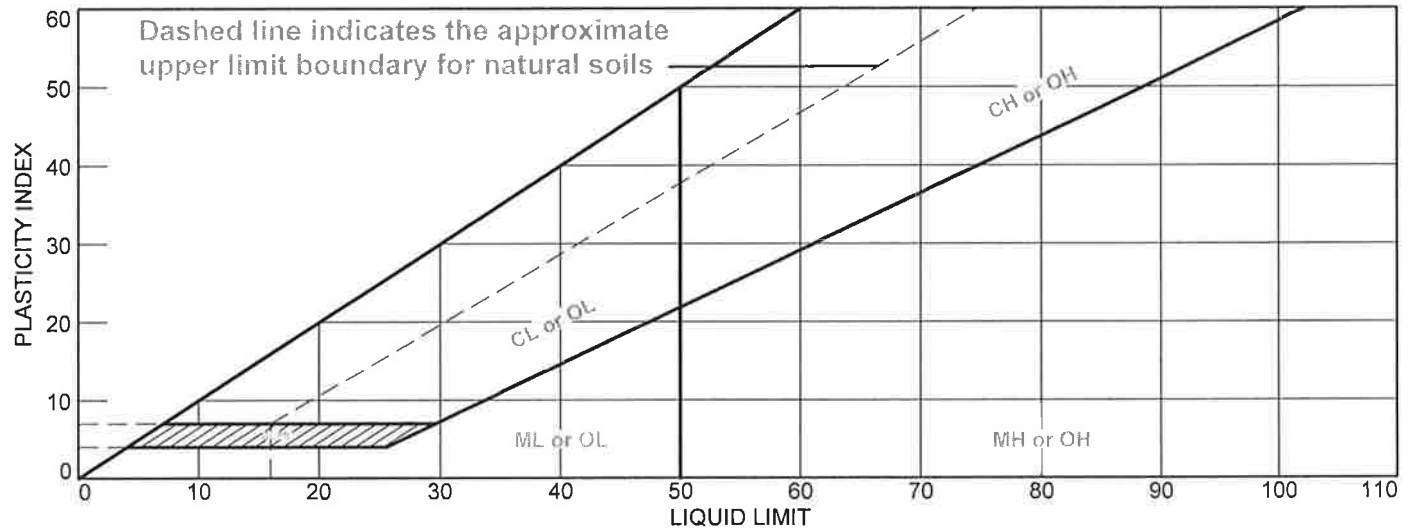
Sample No.: MC07-2

Remarks:



Figure

# LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Silt with sand	NP	NP	NP	98	74	ML

**Project No.** 2636-001.0 **Client:** URS/ARUP/HMM JV

**Project:** California High Speed Train

● **Source:** S0034BR G-52569

**Depth:** 76.0-76.5

**Sample No.:** SS16

**Remarks:**



**Figure**



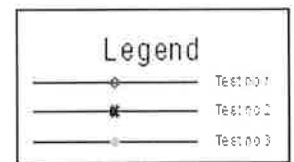
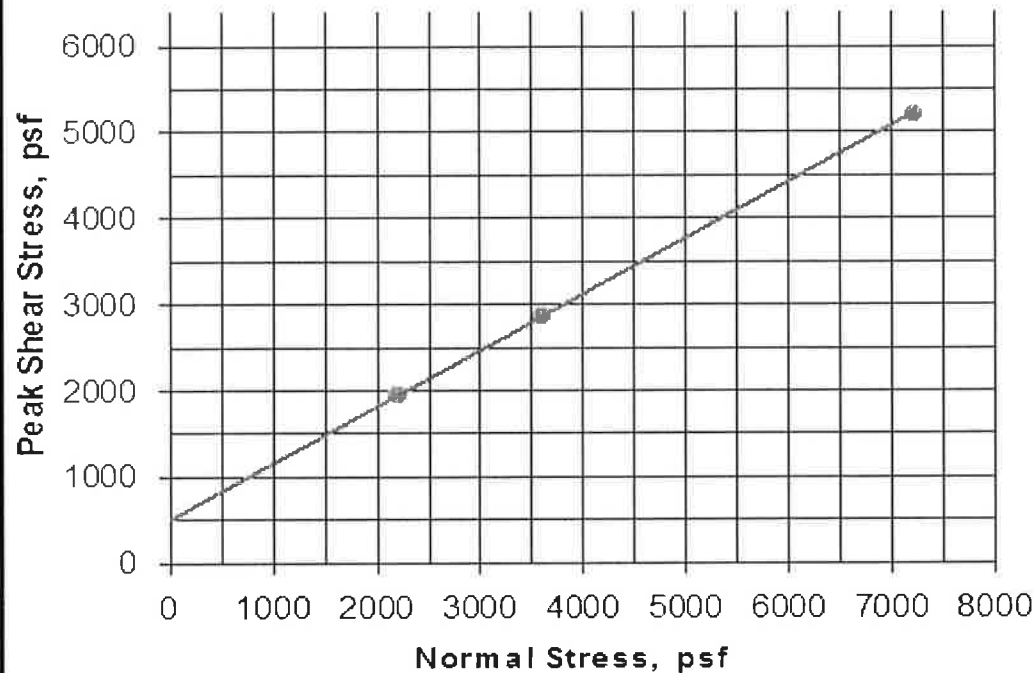
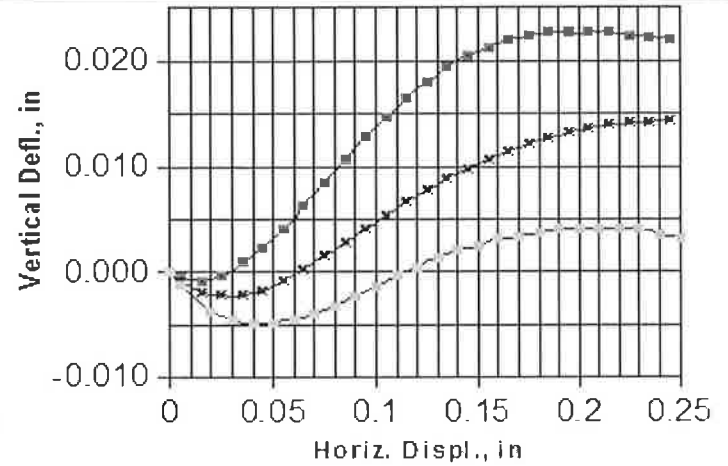
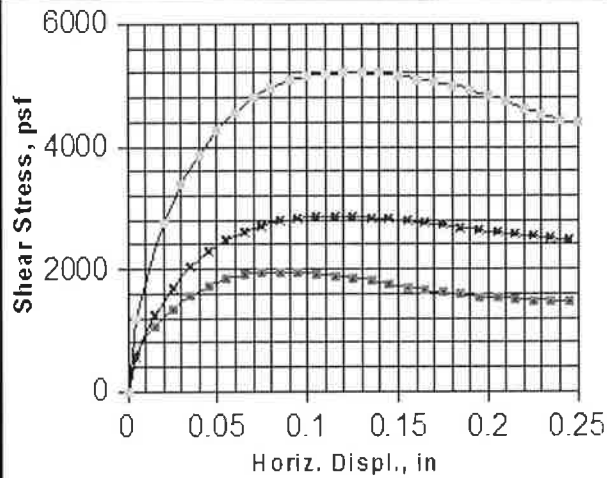
## Direct Shear Moisture and Density Laboratory Results

wet density (pcf) = 104.1

dry density (pcf) = 92.7

moisture (%) = 12.3

Client: <b>URS/ARUP/HMM JV</b>	Boring #: <b>S0034BR</b>	Sample #: <b>MC03-1</b>
Project: <b>California High Speed Train</b>	Depth (ft): <b>11.0-11.5</b>	
Project #: <b>2636-001.0</b>	Soil: <b>SAND</b>	
<b>TEST REPORT:      Direct shear - inundated, consolidated, &amp; drained test</b>		



#### Results

C = 500 psf  
phi = 33 deg.

Gs = 2.70  
Type = undisturbed

Test no.	SigN psf	Peak Shear str., psf	Displ. in.	Strain Rate in./hr	Initial MC %	Initial DD pcf	Initial Sat. %	Initial Void Ratio	Initial Ht. in.	Initial Dia. in.	Final MC %	Final DD pcf	Final Sat. %	Final Void Ratio	Final Ht. in.
1	2200	1956	0.080	0.18	14.6	91.2	47	0.848	1.00	2.416	17.8	91.7	57	0.838	0.994
2	3600	2868	0.115	0.18	14.3	92.5	47	0.822	1.00	2.416	14.6	93.7	50	0.798	0.987
3	7200	5208		0.18	13.8	90.0	43	0.872	1.00	2.416	17.3	93.4	58	0.804	0.964

Client: **URS/ARUP/HMM JV**

Boring #: **S0034BR**

Sample #: **MC03-1**

Project: **California High Speed Train**

Depth (ft): **11.0-11.5**

Project #: **2636-001.0**

Soil: **SAND**

**TEST REPORT:** Direct shear - inundated, consolidated, & drained test

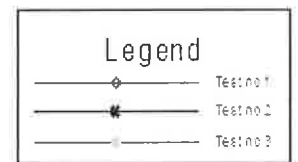
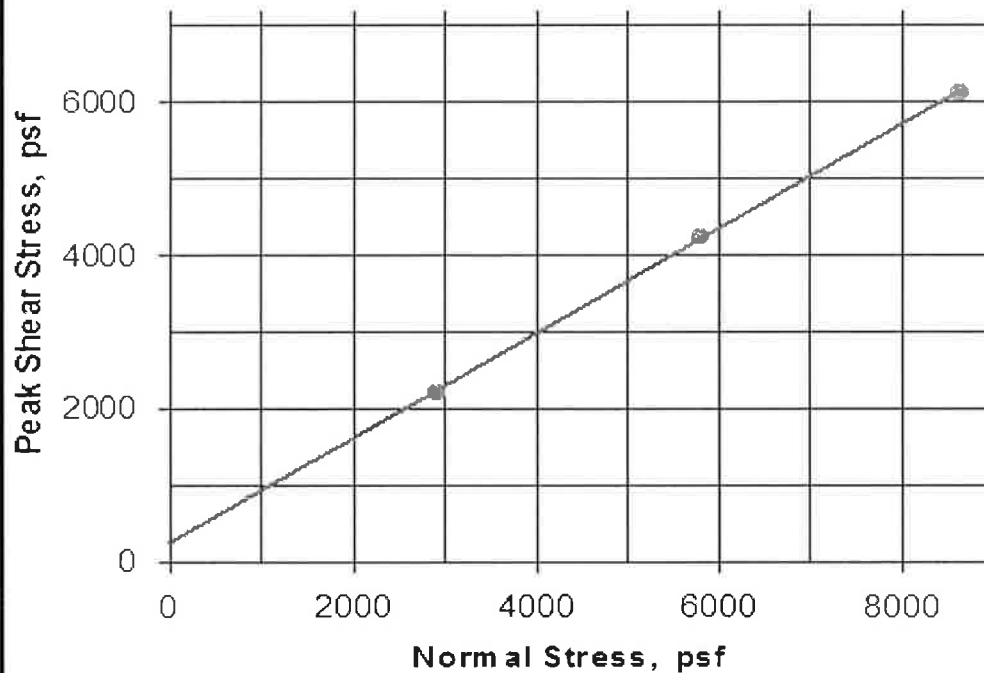
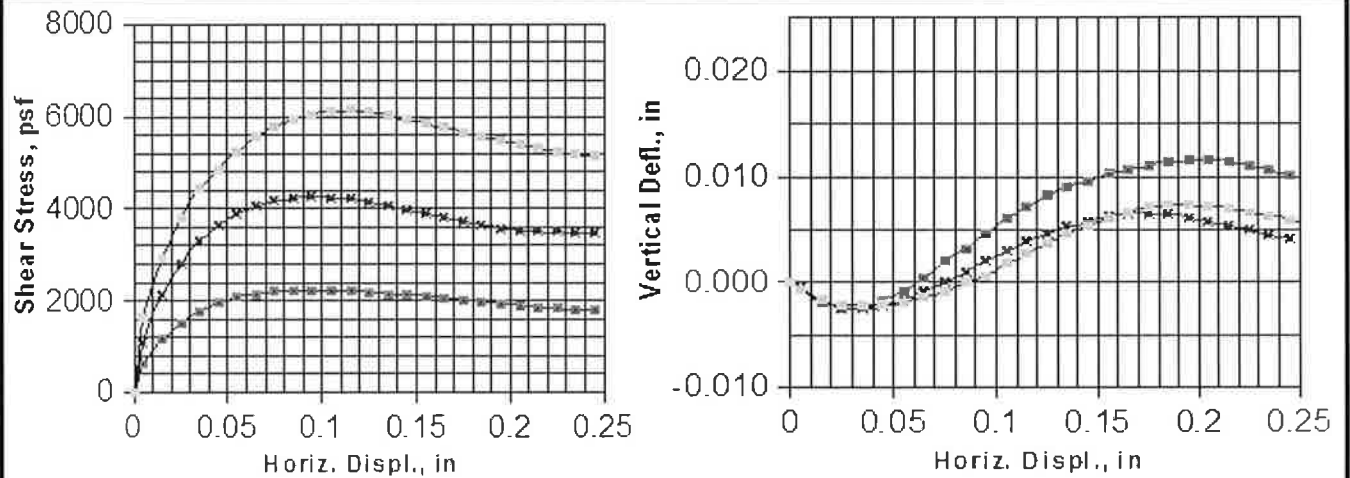
## Direct Shear Moisture and Density Laboratory Results

wet density (pcf) = 101.3

dry density (pcf) = 96.3

moisture (%) = 5.2

Client: <b>URS/ARUP/HMM JV</b>	Boring #: <b>S0034BR</b>	Sample #: <b>MC05-1</b>
Project: <b>California High Speed Train</b>	Depth (ft): <b>21.0-21.5</b>	
Project #: <b>2636-001.0 G-52569</b>	Soil: <b>SAND</b>	
<b>TEST REPORT:      Direct shear - inundated, consolidated, &amp; drained test</b>		



#### Results

C = 250 psf  
phi = 34 deg.

Gs = 2.70  
Type = undisturbed

Test no.	SigN psf	Peak Shear str., psf	Displ. in.	Strain Rate in./hr	Initial MC %	Initial DD pcf	Initial Sat. %	Initial Void Ratio	Initial Ht. in.	Initial Dia. in.	Final MC %	Final DD pcf	Final Sat. %	Final Void Ratio	Final Ht. in.
1	2900	2232	0.095	0.18	5.8	90.6	18	0.860	1.00	2.416	18.6	92.4	61	0.824	0.981
2	5800	4248	0.090	0.18	5.3	92.0	17	0.831	1.00	2.416	17.5	94.6	61	0.782	0.973
3	8600	6144	0.115	0.18	4.8	90.9	15	0.855	1.00	2.416	16.6	93.6	56	0.800	0.971

Client: **URS/ARUP/HMM JV**

Boring #: **S0034BR**

Sample #: **MC05-1**

Project: **California High Speed Train**

Depth (ft): **21.0-21.5**

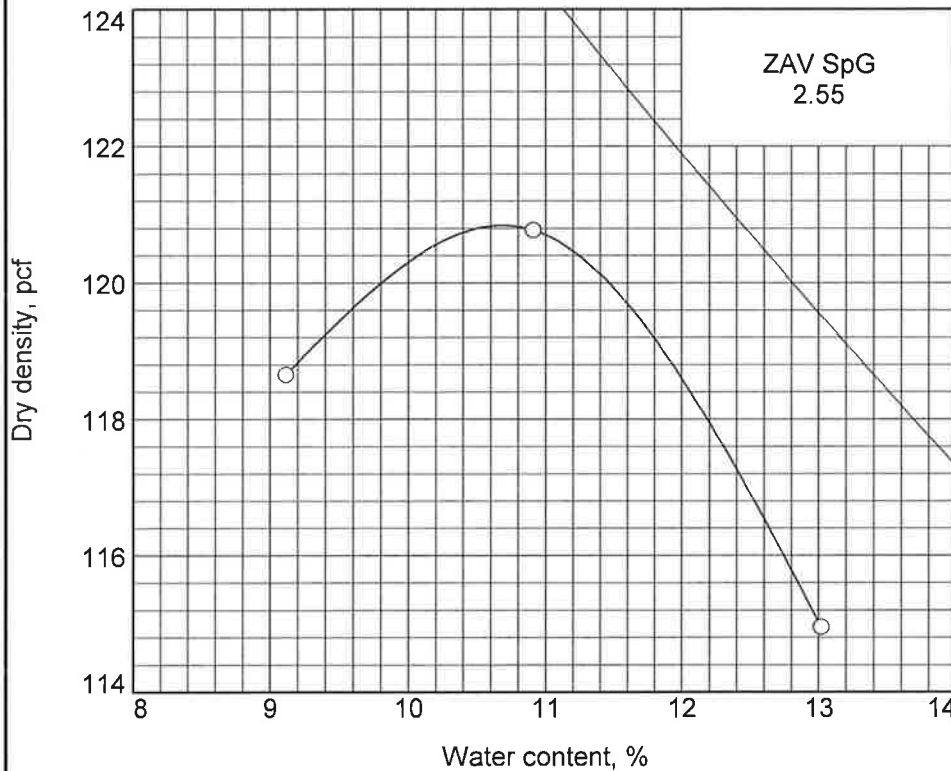
Project #: **2636-001.0 G-52569**

Soil: **SAND**

**TEST REPORT: Direct shear - inundated, consolidated, & drained test**

# COMPACTION TEST REPORT

Curve No.



## Test Specification:

ASTM D 1557-91 Procedure B Modified

Hammer Wt.: 10 lb.

Hammer Drop: 18 in.

Number of Layers: five

Blows per Layer: 25

Mold Size: 0.03333 cu. ft.

## Test Performed on Material

Passing 3/8 in. Sieve

## Soil Data

NM \_\_\_\_\_ Sp.G. \_\_\_\_\_

LL \_\_\_\_\_ PI \_\_\_\_\_

%>3/8 in. \_\_\_\_\_ %<#200 49

USCS \_\_\_\_\_ AASHTO \_\_\_\_\_

## TESTING DATA

	1	2	3	4	5	6
WM + WS	6190.3	6258.4	6197.2			
WM	4223.0	4223.0	4223.0			
WW + T #1	514.8	512.4	532.2			
WD + T #1	471.8	462.0	470.9			
TARE #1	0.0	0.0	0.0			
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	9.1	10.9	13.0			
DRY DENSITY	118.7	120.8	115.0			

## TEST RESULTS

Maximum dry density = 120.8 pcf

Optimum moisture = 10.7 %

## Material Description

Sandy silt

Project No. 2636-001.0 Client: URS/ARUP/HMM JV

Project: California High Speed Train

## Remarks:

Source: S0034BR G-52569

Depth: 0-5

Sample No.: B01



Figure

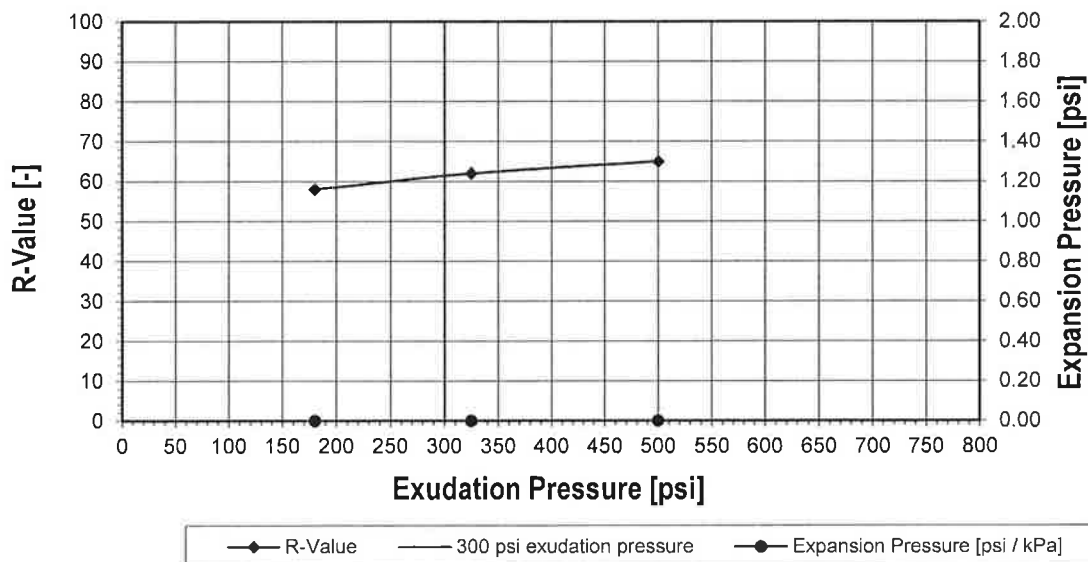
**R-Value ASTM D2844 / CT301**

**Project Name:** California High Speed Train  
**Client Name:** URS/ARUP/HMM JV  
**Type of Material:** Sandy silt  
**Sampling Location:** S0034BR  
**Sample No.:** B-01. 0.0 to 5.0  
**Test (ASTM D2844 / CT301):**

**ISI File No.:** 2636-001.0  
**ISI Lab No.:** G-52569

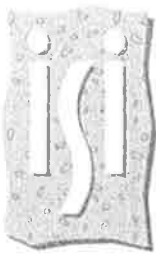
**Test Date:** 9/16/13  
**Run By:** LL  
**Checked By:** LL/PH

Specimen #	1		2		3	
Compaction Pressure [psi / kPa]	350	----	350	----	350	----
Total Moisture [%]	12.3		11.8		11.5	
Density[pcf]	118.9		119.5		119.8	
Expansion Pressure [psi / kPa]	0.00	0.00	0.00	0.00	0.00	0.00
Horizontal Pressure at 160 psi [psi / kPa]	43	296	38	262	34	234
Number of Turns D [-]	4.79		4.80		4.82	
Sample Height [in. / mm]	2.45	62.2	2.47	62.7	2.46	62.5
Exudation Pressure [psi / kPa]	180	1241	325	2241	500	3448
R-Value [-]	58.7		62.6		65.8	
Corrected R-Value [-]	58.0		62.0		65.0	



Corrected R-Value at 300 psi / 2.07 MPa Exudation Pressure =

**61.0**



Client: URS/ARUP/HMM JV  
 Clients Project No.: S-0034R / B-01  
 Clients Project Name: California High Speed Train

Project No.: 2636-001.0  
 ISI Lab No.: G-52569  
 Date Received: 9/5/2013  
 Date Tested: 9/16/2013

CALIFORNIA BEARING RATIO  
 (ASTM D-1883)

Lab No.	G-52569		
Sample:	S-0034R / B-01		
Compaction Procedure:	D1557		
Maximum Dry Density pcf:	120.8		
Optimum Moisture Content %:	10.7		
Condition of CBR Soil Sample:	Soaked 96 hours		
% + 3/4" Size Replacement:	0		
	1	2	3
Dry Density Before Soaking pcf:	120	115.4	110
Percent Relative Compaction %:	99.3	95.5	91.1
Dry Density After Soaking pcf:	121.4	116.2	110.8
Moisture Content Before Compaction %:	10.7	10.7	10.5
Moisture Content After Compaction %:	10.7	10.7	10.5
Moisture Content Top 1" After Soaking %:	16	16.1	16.4
Average Moisture Content After Soaking %:	12	14	15.6
Percent Swell %:	0.5	0.4	0.2
Bearing Ratio @ 0.100"	17	14	13
Bearing Ratio @ 0.200"	38	24	16
Surcharge Weight lbs.:	10	10	10

Specimens were compacted at optimum moisture content (determined in accordance with ASTM D1557) with varying amounts of compactive effort and then soaked for 96 hours with a 10 pound surcharge prior to penetration.

Specimen No.	Percent Relative Compaction	Bearing Ratio @ 0.1" Pen.	Bearing Ratio @ 0.2" Pen.	Bearing Ratio @ 0.3" Pen.	Bearing Ratio @ 0.4" Pen.	Bearing Ratio @ 0.5" Pen.	Percent Swell
	90	13	15	0	0	0	0.2
	95	14	23	0	0	0	0.4
	100	21	43	0	0	0	0.5

Per ASTM D-1883, when the bearing ratio at 0.2 inches is greater than the bearing ratio at 0.1 inches, use the bearing ratio at 0.2 inches.